DIFFERENT RADIATION AND METAMORPHIC HISTORY OF THE KAINSAZ CO 3.2 CHONDRULES

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Track and thermoluminescence parameters in chondrules from the Kainsaz CO 3.2 chondrite have been studied. Obtained results indicate on their individual shock-thermal history on the early pre-accretion stage of the meteorite parent body formation.

The pre-accretion stage of the chondrite formation is ane of the mostly important in the history of these meteorites. A wide variaty of the last years investigations (for example [1-3]) indicate that in this early stage not only the chondrules and the mineral grain aglomeration processes occured, but the principal metamorphic processes are related to this period. It is possible that the last processes can be due to the local cases of the shock-thermal reworking of the initial chondrite matter. Mostly significant in so doing is proved that during the whole subsequent history of the chondrite existence the thermal conditions were not so critical that can to result in the total flattening of the quite of a number of parameters which indicate the heterogeneous character of the chondrite matter. To these parameters in particular track and thermoluminescence (TL) characteristics are related. The investigations of the identity and difference of these parameters for the ordinary and the carbonaceous chondrites acquire a great importance at present [4].

The aim of this work is the study of the radiation-thermal history of the carbonaceous chondrite matter with help of the complex measuring of the nuclear track and TL-parameters in the chondrules of the low-metamorphic chondrite Kainsaz CO 3.2. The chief objective in this case was the elucidation of the essential siqns which give possibility to consider the radiation and thermal conditions existed at the pre-accretion stage of these meteorite parent body formation.

The track results obtained for the about 500 olivine grains (higher than 30 μm in size) which were separated from 98 chondrules of the microgranular and porphiritic types are the following: 1)The total spread of the track density values (ρ) is in the interval of three orders of magnitude $(0.003\text{-}2)10^{6}cm^{-2}$ 2)The track density due to the fission fragments of the uranium nuclei, concentration of which for the searched olivine crystals is in the interval $(0.2\text{-}2.3)\ 10^{-8}$ g/g, is not higher than $5\cdot10^{3}cm^{-2}$. 3)The part of the crystals with $\rho \geq 10^{5}cm^{-2}$ amounts to smaller than 10%. 4)Only in two crystals $\rho \geq 10^{6}cm^{-2}$ was obsered. 5)The gradient O from the surface to inside of the individual grains was detected in nine cases. These track results indicate, that in the part of the carbonaceous chondrite Kainsaz matter the traces of the early pre-accretion irradiation were storaged. The fraction of this matter as compared to the total crystal number under investigation is equal to a few percentages and the integral irradiation dose is smaller by 2-3 orders of magnitude than for brecciated ordinary chondrites

matter, which was influenced by the intensive irradiation during the regolith stage of their parent bodies formation.

The results of TL-investigations for the 50 individual chondrules of the Kainsaz CO 3.2 in relation with the same TL-parameters for chondrules of the Dhajala H 3.8 chondrite are presented in Figure 1a,b. The character of the relationship between TL-parameters - FWHM and the temperature peak maximum T_{peak} - indicate that the chondrules under investigation represent at least two different groups: for the first group the both TL-parameters are in the very narrow interval (FWHM about (27+7)°C and T_{peak} (150+12)°C); however the second chondrule group is characterised by the directly proportional relationship of these TL-parameters. In this case FWHM values are increased by more then two-fold that can be due to different dislocations and electron trap level concentrations depending on the different shock-thermal local events.

A correlation between track and TL-parameters for the investigated chondrules was not observed that is in accordance with a concept of local character of the relatively weak shock-thermal processes,presented in the pre-accretion solar nebula conditions.

References. 1.Fredriksson K. (1983) - Chondrules and their origins ed. by E.A.King, Houston,44. 2.Kurat G. (1988) -Phil. Trans. R. Soc.Lond., **A325**, 459-482. 3.Ninagawa K. et al. (1991) - Proc. NIPR Symp. Antarct. Meteorites, **4**, 344-351. 4. Sears D.W.G. et al. (1991) - Ibid, 319-343.

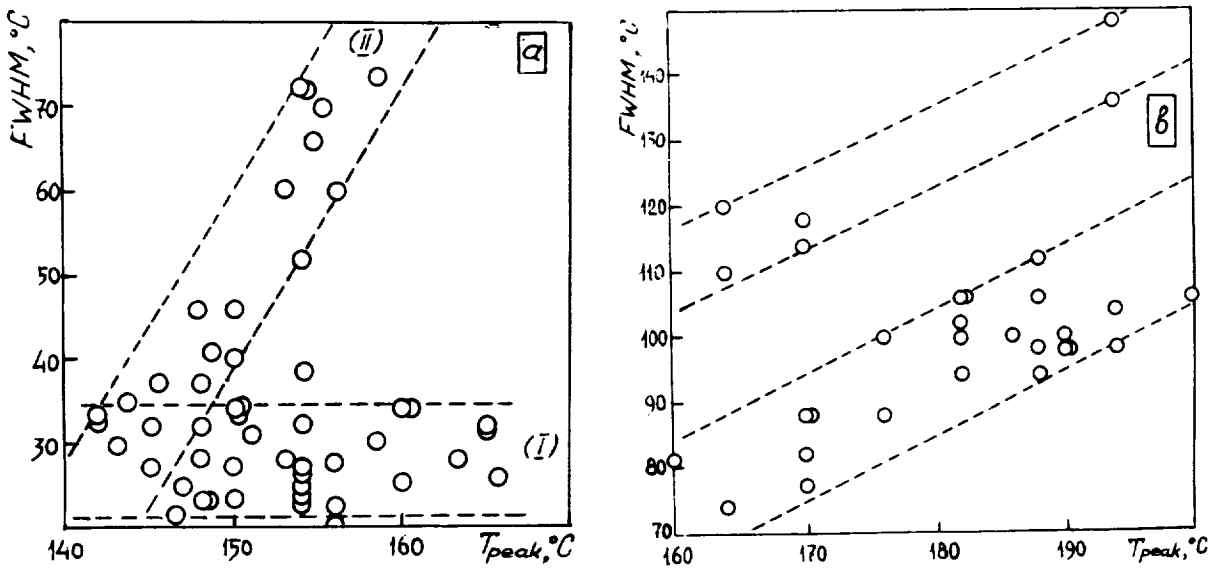

Fig.1. TL-parameters FWHM and Tpeak relations in the individual chondrules for the Kainsaz CO 3.2 (a) and Dhajala H 3.8 (b) chondrites.